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Examining the Relationship Between Mental Toughness and Anxiety Levels of Professional Volleyball Players

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A B S T R A C T

The main objective of this research is to reveal the relationship between anxiety levels and mental toughness among professional volleyball players and to determine how these constructs differ according to demographic variables. The study group consisted of 139 voluntary athletes (86 female. 53 male) who are licensed and actively competing in volleyball in the Eastern Anatolia Region. The data collection tool used in the study consisted of two parts: the first part was the “Personal Information Form” used to identify the demographic characteristics of the athletes; the second part included the “Sport Anxiety Scale” to measure the anxiety levels of the athletes and the “Sports Mental Toughness Questionnaire” to assess their mental toughness levels. The data were analyzed using the SPSS statistical software. and the level of significance was set at $p<0.05$. According to the results of the study. significant differences were found in the Sport Anxiety Scale scores based on gender. age. education level. province of residence. years of sports experience. and number of weekly training sessions ($p<0.05$). while no significant difference was found based on income level and league level ($p>0.05$). Regarding mental toughness. significant differences were observed based on gender. education level. province of residence. and number of weekly training sessions ($p<0.05$). whereas no significant differences were found in relation to age. income level. league level. and years of sports experience ($p>0.05$). It was observed that female athletes had higher levels of anxiety compared to male athletes. while male athletes exhibited higher levels of mental toughness than female athletes. Additionally. athletes with lower income levels and those with high school education had higher levels of anxiety and mental toughness compared to those with middle income and university education. In terms of league participation. athletes playing in the regional league exhibited higher anxiety levels than those in the 2nd league. whereas athletes in the 2nd league demonstrated greater mental toughness than those in the regional league. In conclusion. it was found that the athletes included in the study had moderate levels of anxiety and mental toughness. and that education level and league participation significantly affected both constructs. In this context. it is believed that implementing activities aimed at developing both anxiety management and mental toughness. especially from an early age. may positively impact athletic performance.

Keywords: *Professional. Volleyball. Anxiety. Mental Toughness*

1. Introduction

Sport is not merely an activity involving physical skills. but a multidimensional process in which psychological resilience plays a significant role. In this regard. especially in professional-level sports. mental toughness and anxiety are key psychological factors that influence athletes' performance and success (1). In team sports like volleyball. which demand quick decision-making. high focus. and stress management. athletes' mental and emotional skills are put to the test. In high-performance sports such as professional volleyball. where rapid decisions and sustained concentration are essential. mental toughness and anxiety emerge as psychological factors determining success. Anxiety is considered one of the most critical psychological states directly affecting athletic performance. It is well-known that the anxiety experienced by athletes before or during competitions can negatively impact focus. decision-making. and coordination skills (2). Therefore. keeping anxiety at an optimal level is vital for athletes to perform well and achieve success. Moreover. the way athletes cope with anxiety is directly related to their mental toughness. The concept of mental toughness is gaining increasing importance in the field of sports psychology. Athletes who are mentally tough are reported to recover more quickly under stress or continue performing in competitions without losing motivation after making mistakes (3). In team sports. decision-making under pressure and emotional control can influence not only the athlete's own performance but also the overall team performance. Therefore. mental toughness is seen not only as an individual trait but also as a strategic advantage within gameplay. In fast-paced. high-intensity sports like volleyball that require intense focus. mental factors are extremely important. Athletes must make split-second decisions during competitions. such as receiving a serve. blocking. or keeping the ball in play. In such situations. mental toughness can be the factor that separates success from failure. It has been reported that mentally resilient athletes tend to experience lower levels of anxiety and cope with stress more effectively (4). Professional athletes are expected to perform not only under structured training schedules but also under the psychological pressure of intense competition. In this context. mental toughness refers to the ability to maintain athletic performance. stay motivated. and effectively manage stress in high-pressure situations. Generally. athletes with high levels of mental toughness are more resilient in the face of competitive stress and exhibit more consistent performance. The present study aims to examine the relationship between professional volleyball players' anxiety levels and mental toughness and to explore how these factors vary across different demographic variables.

2. Methods and Materials

2.1. Study Design and Participants

This study. which examines the anxiety and mental toughness levels of volleyball players. was conducted using a relational screening model. one of the quantitative research methods. The ethics approval for this study was obtained from the Ethics Committee of Bitlis Eren University. Social and Human Sciences (2025/01-5).

The study group consisted of 139 voluntary athletes (86 women. 53 men) who are professionally licensed and actively participating in volleyball in the Eastern Anatolia Region.

2.2. Measures

The survey method was used as the data collection technique in this research. The questionnaire applied in the study consisted of two parts:

- The first part included the "Personal Information Form" to determine the demographic characteristics of the athletes.
- The second part consisted of two scales:
    1. The Sport Anxiety Scale. originally developed by Smith et al. (1986) and adapted into Turkish by Akyol et al. (2016). was used to measure the athletes' anxiety levels (5, 6).
    2. The Sport Mental Toughness Questionnaire (SMTQ-14). developed by Sheard et al. (2009) and adapted into Turkish by Altınbaş (2015). was used to measure the athletes' mental toughness levels.

Sport Anxiety Scale – 2 (SAS-2): To determine athletes' anxiety levels. the Sport Anxiety Scale developed by Smith et al. (1986) and adapted to Turkish by Akyol et al. (2016)

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was used (5, 6). This scale consists of 15 items in total. based on a 4-point Likert scale. and includes three subdimensions with five items each:

- Anxiety
- Somatic Anxiety
- Concentration

According to the scale's developers. the internal consistency coefficients of the subdimensions were .84 for worry. .82 for somatic anxiety. and .75 for concentration (6).

Sport Mental Toughness Questionnaire (SMTQ-14): The SMTQ. developed by Sheard. Golby. and Van Wersch (2009) and adapted into Turkish by Altınbaş (2015). was used to assess mental toughness. It includes 14 items. rated on a 4-point Likert scale (1 = completely untrue. 4 = very true). and consists of the following subdimensions:

- Confidence (items 1. 5. 6. 11. 13. 14)
- Control (items 3. 8. 10. 12)
- Constancy (items 2. 4. 7. 9)

The Turkish adaptation yielded a Cronbach's Alpha coefficient of .70. indicating an acceptable level of internal consistency (7).

2.3. Data Analysis

Data were analyzed using the SPSS statistical software. Descriptive statistics were used to assess the athletes' demographic data. anxiety levels. and mental toughness levels.

To assess normality. skewness and kurtosis values were examined. The data were found to be normally distributed. as the values fell within the acceptable range of ±3.5 (8).

- For comparing two independent groups. Independent Samples t-test was used.
- For comparing more than two groups. One-Way ANOVA was employed.

The level of statistical significance was set at $p < 0.05$.

3. Findings and Results

All skewness and kurtosis values of both scales were found to be within the acceptable range of ±3.5. indicating that the data follow a normal distribution (8).

Table 1

Skewness and Kurtosis Values of the Scales

Variables	M	SD	Skewness	Kurtosis
Somatic	8.00	2.77	1.004	0.527
Anxiety	8.72	3.67	0.845	0.085
Concentration	7.36	2.42	1.325	2.422
Sport Anxiety Scale	24.21	7.91	1.057	0.838
Confidance	18.41	2.84	-0.559	1.743
Control	10.17	2.71	-0.098	-0.278
Contancy	10.28	1.42	1.292	3.221
Sport Mental Toughness Inventory	38.72	4.17	0.818	3.078

Based on Table 2. 61.9% of the participants were female and 38.1% male. Most were between 18–22 years old (74.1%) and held a university degree (71.2%). Additionally. 83.5% had a middle income level. and the majority played in the 2nd League (66.9%).

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Table 2

Demographic Information of the Athletes

Variables		Frequency	Percentage (%)
Gender	Female	86	61.9
	Male	53	38.1
Age	18-22 years	103	74.1
	23-27 years	36	25.9
Education Level	High School	40	28.8
	Universty	99	71.2
Income Level	Low	23	16.5
	Middle	116	83.5
Province of Residence	Diyarbakır	42	30.2
	Bitlis	18	12.9
	Batman	23	16.5
	Hakkâri	13	9.4
	Van	16	11.5
	Siirt	17	12.2
	Elâzığ	10	7.2
League Played In	Regional League	46	33.1
	2nd League	93	66.9
Year of Sports	1-4 years	53	38.1
	5-8 years	40	28.8
	9-12 years	30	21.6
	12 years and above	16	11.5
Weekly Training Frequency	1-2	28	20.1
	3-4	83	59.7
	5-6	28	20.1

There was a statistically significant difference in the worry subscale scores of the Sport Anxiety Scale by gender ($p < .05$). with female athletes scoring higher. For the Confidence subscale of the Mental Toughness Inventory. male athletes had significantly higher scores ($p < .05$). No significant differences were found for other subscales ($p > .05$).

Table 3

T-Test Analyses According to Athletes' Gender Variable

	Gender	M	SD	t	p
Somatic	Female	8.41	2.87	1.586	0.29
	Male	7.90	2.60		
Anxiety	Female	9.62	3.90	2.649	0.00
	Male	7.96	3.04		
Concentration	Female	7.67	2.43	.522	0.60
	Male	7.45	2.42		
Sport Anxiety Scale	Female	25.72	8.29	1.749	0.08
	Male	23.32	7.09		
Confidence	Female	17.66	2.98	-3.602	0.00
	Male	19.37	2.24		
Control	Female	10.48	2.65	1.802	0.07
	Male	9.64	2.74		
Constancy	Female	10.38	1.39	.025	0.98
	Male	10.37	1.49		
Mental Toughness Inventory	Female	38.53	4.44	-1.184	0.23
	Male	39.39	3.67		

*p<0.05

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There were statistically significant differences in worry. concentration. and overall sport anxiety scores by age group ($p < .05$). with younger athletes (18–22) reporting higher anxiety. However. mental toughness and its subcomponents showed no significant differences by age ($p > .05$).

Table 4

Independent Samples t-Test Results by Age Group

Variable	Age	M	SD	t	p
Somatic	18-22 yrs	8.42	2.89	1.472	0.14
	23-27 yrs	7.63	2.35		
Anxiety	18-22 yrs	9.44	3.81	2.507	0.01
	23-27 yrs	7.69	2.93		
Concentration	18-22 yrs	7.85	2.45	2.205	0.02
	23-27 yrs	6.83	218		
Sport Anxiety Scale	18-22 yrs	25.72	8.20	2.362	0.02
	23-27 yrs	22.16	6.41		
Confidence	18-22 yrs	18.15	3.06	-1.133	0.25
	23-27 yrs	18.77	2.04		
Control	18-22 yrs	10.33	2.67	1.285	0.20
	23-27 yrs	9.66	2.78		
Constancy	18-22 yrs	10.35	1.50	-.308	0.75
	23-27 yrs	10.44	1.18		
Mental Toughness Inventory	18-22 yrs	38.85	4.44	-.043	0.96
	23-27 yrs	38.88	3.34		

*p<0.05

According to Table 5. no statistically significant difference was found between athletes' material income level and mean scores of Sport Anxiety Scale and subdimensions of the Mental Toughness Inventory ($p > 0.05$).

Table 5

T-Test Analyses According to Athletes' Material Income Level

Variable	Material Income	M	SD	t	p
Somatic	Low	8.78	2.96	1.058	0.29
	Middle	8.11	2.73		
Anxiety	Low	9.30	3.21	.443	0.65
	Middle	8.93	3.77		
Concentration	Low	7.65	2.28	.134	0.89
	Middle	7.57	2.46		
Sport Anxiety Scale	Low	25.73	6.70	.618	0.53
	Middle	24.62	8.14		
Confidence	Low	18.60	2.65	.538	0.59
	Middle	18.25	2.88		
Control	Low	11.00	2.61	1.625	0.10
	Middle	10.00	2.71		
Constancy	Low	10.21	1.67	-.602	0.54
	Middle	1041	1.37		
Mental Toughness Inventory	Low	39.82	3.56	1.213	0.22
	Middle	38.67	4.27		

*p<0.05

According to Table 6, no statistically significant difference was found between athletes' league and the Sport Anxiety Scale and Mental Toughness Inventory subdimension mean scores ($p > 0.05$).

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Table 6

T-Test Analyses According to the League in Which Athletes Play

Variable	League	M	SD	t	p
Somatic	Regional League	8.67	2.99	1.350	0.17
	2nd League	8.00	2.64		
Anxiety	Regional League	9.23	3.29	.554	0.58
	2nd League	8.87	3.86		
Concentration	Regional League	7.93	2.87	1.181	0.25
	2nd League	7.41	2.16		
Sport Anxiety Scale	Regional League	25.84	8.38	1.092	0.27
	2nd League	24.29	7.66		
Confidence	Regional League	17.97	2.52	-.987	0.32
	2nd League	18.48	2.98		
Control	Regional League	10.39	2.61	.689	0.49
	2nd League	10.05	2.76		
Constancy	Regional League	10.47	1.39	.562	0.57
	2nd League	10.33	1.44		
Mental Toughness Inventory	Regional League	38.84	3.89	-.031	0.97
	2nd League	38.87	4.32		

*p<0.05

According to Table 7, a statistically significant difference was found between athletes' educational status and the Anxiety subdimension mean score of the Sport Anxiety Scale ($p < 0.05$). No significant differences were found for somatic and concentration subdimensions ($p > 0.05$). Also, a significant difference was found between educational status and the Confidence subdimension mean score of the Mental Toughness Inventory ($p < 0.05$), but not for control and persistence subdimensions ($p > 0.05$).

Table 7

T-Test Analyses According to Athletes' Educational Status

Variable	Education Status	M	SD	t	p
Somatic	High School	8.22	2.82	.005	0.99
	University	8.22	2.77		
Anxiety	High School	9.92	3.73	1.918	0.05*
	University	8.61	3.60		
Concentration	High School	7.95	2.78	1.114	0.26
	University	7.44	2.26		
Sport Anxiety Scale	High School	26.10	8.29	1.227	0.22
	University	24.28	7.74		
Confidence	High School	17.52	3.26	-2.114	0.03*
	University	18.63	2.60		
Control	High School	10.47	2.54	.854	0.39
	University	10.04	2.78		
Constancy	High School	10.27	1.19	-.557	0.57
	University	10.42	1.51		
Mental Toughness Inventory	High School	38.27	3.91	-1.057	0.29
	University	38.10	4.26		

*p<0.05

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According to Table 8, a statistically significant difference was found between athletes' city of residence and the Anxiety sub-dimension of the Sport Anxiety Scale ($p<0.05$), while no significant differences were observed in the somatic and concentration sub-dimensions ($p>0.05$). A significant difference was also found between city of residence and the Control sub-dimension of the Mental Toughness Inventory ($p<0.05$), while no significant difference was observed in the Confidence and Continuity sub-dimensions ($p>0.05$). Post-hoc Tukey tests revealed that athletes living in Elâzığ (Mean=10.80) scored significantly higher on the Anxiety sub-dimension compared to those in Van (10.75), Hakkâri (10.23), Bitlis (9.61), Siirt (8.47), Diyarbakır (8.23), and Batman (7.56). Regarding the Control sub-dimension, athletes in Hakkâri (11.30) scored significantly higher than those in Bitlis (10.61), Elâzığ (10.45), Diyarbakır (10.45), Van (10.31), Siirt (9.41), and Batman (8.65). Additionally, for the overall Mental Toughness Inventory, a significant difference was found by city of residence ($F=2.533$, $p<0.05$). Tukey results showed athletes from Elâzığ (Mean=40.70) scored significantly higher than those from Diyarbakır (39.90), Siirt (39.41), Hakkâri (39.46), Bitlis (38.83), Batman (36.91), and Van (36.75).

Table 8

Variance Analysis According to the Province Where Athletes Live

Variable	Province	M	SD	F	p	Difference
Somatic	Diyarbakır (1)	8.40	2.75	.828	0.55	-
	Bitlis (2)	8.66	3.16			
	Batman (3)	7.43	2.46			
	Hakkâri (4)	8.69	3.03			
	Van (5)	8.43	2.63			
	Siirt (6)	7.41	2.59			
	Elâzığ (7)	8.90	3.10			
Anxiety	Diyarbakır (1)	8.23	3.51	2.410	0.03*	4-7. 5-7
	Bitlis (2)	9.61	3.56			
	Batman (3)	7.56	3.17			
	Hakkâri (4)	10.23	3.44			
	Van (5)	10.75	3.41			
	Siirt (6)	8.47	3.53			
	Elâzığ (7)	10.80	4.93			
Concentration	Diyarbakır (1)	7.30	2.39	1.070	0.38	-
	Bitlis (2)	8.11	2.86			
	Batman (3)	7.08	1.99			
	Hakkâri (4)	8.46	1.94			
	Van (5)	8.37	1.92			
	Siirt (6)	7.29	2.88			
	Elâzığ (7)	7.10	2.92			
Sport Anxiety Scale	Diyarbakır (1)	23.95	7.70	1.461	0.19	-
	Bitlis (2)	26.38	8.93			
	Batman (3)	22.08	6.74			
	Hakkâri (4)	27.38	7.67			
	Van (5)	27.56	6.59			
	Siirt (6)	23.17	8.14			
	Elâzığ (7)	26.80	9.99			
Confidence	Diyarbakır (1)	18.71	3.11	1.911	0.08	-
	Bitlis (2)	17.83	1.72			
	Batman (3)	18.30	2.91			
	Hakkâri (4)	17.84	1.46			
	Van (5)	16.56	3.65			
	Siirt (6)	19.35	2.84			
	Elâzığ (7)	19.20	1.93			
Control	Diyarbakır (1)	10.45	2.81	2.334	0.03	2-4. 2-7
	Bitlis (2)	10.61	2.32			

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	Batman (3)	8.65	3.09			
	Hakkâri (4)	11.30	1.43			
	Van (5)	10.31	2.57			
	Siirt (6)	9.41	2.42			
	Elâzığ (7)	10.45	2.82			
Constancy	Diyarbakır (1)	10.73	1.91	1.236	0.29	-
	Bitlis (2)	10.38	1.28			
	Batman (3)	9.95	.76			
	Hakkâri (4)	10.30	.85			
	Van (5)	9.87	.95			
	Siirt (6)	10.64	1.41			
	Elâzığ (7)	10.30	1.49			
Mental Toughness Inventory	Diyarbakır (1)	39.90	4.53	2.533	0.02	-
	Bitlis (2)	38.83	3.24			
	Batman (3)	36.91	4.01			
	Hakkâri (4)	39.46	2.18			
	Van (5)	36.75	4.15			
	Siirt (6)	39.41	3.87			
	Elâzığ (7)	40.70	4.98			

*p<0.05

According to Table 9, there is a statistically significant difference between athletes' duration of playing career and the Concentration sub-dimension of the Sport Anxiety Scale (p<0.05), while no significant differences were found in the Somatic and Anxiety sub-dimensions (p>0.05). No significant differences were observed in the sub-dimensions of Confidence, Control, and Continuity of the Mental Toughness Inventory (p>0.05). Post-hoc Tukey test results showed that athletes with 5-8 years of playing experience (Mean=8.02) scored significantly higher in the Concentration sub-dimension compared to those with 1-4 years (7.92), 9-12 years (7.10), and 12 years or more (6.31).

Table 9

Variance Analysis According to Athletes' Years of Playing Career

Variable	Year of Sports	M	SD	F	p	Difference
Somatic	1-4 years (1)	8.13	2.74	1.763	0.15	-
	5-8 years (2)	8.85	2.83			
	9-12 years (3)	8.20	2.96			
	12 years and above (4)	7.00	2.06			
Anxiety	1-4 years (1)	9.54	3.48	2.284	0.08	-
	5-8 years (2)	9.57	4.21			
	9-12 years (3)	7.83	2.97			
	12 years and above (4)	7.87	3.63			
Concentration	1-4 years (1)	7.92	2.66	2.755	0.04	1-2. 2-3
	5-8 years (2)	8.02	2.35			
	9-12 years (3)	7.10	2.20			
	12 years and above (4)	6.31	1.57			
Sport Anxiety Scale	1-4 years (1)	25.60	7.95	2.385	0.07	-
	5-8 years (2)	26.45	8.39			
	9-12 years (3)	23.13	7.26			
	12 years and above (4)	21.18	6.54			
Confidence	1-4 years (1)	17.73	3.04	2.196	0.09	-
	5-8 years (2)	18.47	3.12			
	9-12 years (3)	18.36	2.31			
	12 years and above (4)	19.75	1.69			
Control	1-4 years (1)	10.33	2.52	2.151	0.09	-
	5-8 years (2)	10.57	2.65			

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	9-12 years (3)	10.13	2.67			
	12 years and above (4)	8.62	3.20			
Continuity	1-4 years (1)	10.07	1.05	1.872	0.13	-
	5-8 years (2)	10.77	1.68			
	9-12 years (3)	10.36	1.71			
	12 years and above (4)	10.43	1.03			
Mental Toughness Inventory	1-4 years (1)	38.15	3.62	1.230	0.30	-
	5-8 years (2)	39.82	4.47			
	9-12 years (3)	38.86	5.00			
	12 years and above (4)	38.81	3.14			

*p<0.05

According to Table 10, no statistically significant difference was found between athletes' weekly training frequency and the somatic, anxiety, and concentration sub-dimensions of the Sport Anxiety Scale (p>0.05). However, a statistically significant difference was found between weekly training frequency and the Confidence sub-dimension of the Mental Toughness Inventory (p<0.05), while no significant differences were found in the Control and Continuity sub-dimensions (p>0.05). Post-hoc Tukey test results indicated that athletes training 5-6 times per week (Mean=19.07) scored significantly higher in the Confidence sub-dimension than those training 3-4 times (18.42) and 1-2 times (17.25) per week.

Table 10

Variance Analysis According to Athletes' Weekly Training Frequency

Variable	Weekly Training Frequency	M	SD	F	p	Difference
Somatic	1-2 (1)	8.75	3.27	.667	0.51	-
	3-4 (2)	8.13	2.58			
	5-6 (3)	7.96	2.83			
Anxiety	1-2 (1)	9.92	3.93	1.672	0.19	-
	3-4 (2)	8.96	3.46			
	5-6 (3)	8.14	3.95			
Concentration	1-2 (1)	8.00	2.72	.676	0.51	-
	3-4 (2)	7.56	2.22			
	5-6 (3)	7.25	2.71			
Sport Anxiety Scale	1-2 (1)	26.67	9.05	1.271	0.28	-
	3-4 (2)	24.66	7.25			
	5-6 (3)	23.35	8.51			
Confidence	1-2 (1)	17.25	2.47	3.110	0.04	1-3
	3-4 (2)	18.42	2.95			
	5-6 (3)	19.07	2.60			
Control	1-2 (1)	11.10	2.36	2.492	0.08	-
	3-4 (2)	9.80	2.62			
	5-6 (3)	10.28	3.12			
Continuity	1-2 (1)	10.21	1.06	.837	0.43	-
	3-4 (2)	10.33	1.40			
	5-6 (3)	10.67	1.76			
Mental Toughness Inventory	1-2 (1)	38.57	3.23	1.392	0.25	-
	3-4 (2)	38.56	3.90			
	5-6 (3)	40.03	5.51			

*p<0.05

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4. Discussion and Conclusion

he research findings revealed that anxiety and mental toughness in professional volleyball players showed significant differences according to variables such as gender, age, educational status, city of residence, and the number of weekly training sessions. Accordingly, it was determined that female athletes have higher levels of anxiety compared to male athletes; on the other hand, male athletes scored higher on mental toughness. This situation aligns with findings frequently emphasized in the literature, indicating that women experience more performance anxiety in sports. When evaluated in terms of age, it was observed that younger athletes (ages 18-22) had higher levels of anxiety but lower levels of mental toughness. This indicates that as experience increases, individuals develop better coping skills for stress and mental toughness is reinforced over time. Educational status also emerges as an important determinant. The fact that high school graduate athletes have higher levels of both anxiety and mental toughness compared to university graduates may be explained by the possibility that individuals at the university level possess more academic and social skills. However, this finding should be supported by further studies, and the impact of educational level on these psychological constructs should be analyzed in greater depth. The cities where the athletes live created significant differences, especially in the sub-dimensions of worry and control. This suggests that regional socio-cultural structures may influence athletes' psychological perceptions and responses. As the frequency of weekly training increased, mental toughness, particularly in the confidence dimension, was observed to rise. It can be said that regular training strengthens individuals not only physically but also psychologically. Weinberg and Gould (2015) stated that women exhibit different stress responses compared to men in terms of emotional states (9). Clough et al. (2002) expressed that individuals with high mental toughness are more determined under pressure, and male participants exhibited this trait more than female participants (4). Jones et al. (2007) noted that athletes who demonstrate mental toughness at an elite level develop these qualities over time and through repeated pressure situations (3). Toy et al. (2023) reported that athletes with higher levels of irrational beliefs tend to have higher competition anxiety levels (10). In their study on Olympic athletes, Gould et al. (2002) reported that younger participants experienced higher levels of anxiety and had lower mental toughness scores (1). Vealey and Chase (2016) suggested that university-level education enhances psychological skills such as self-awareness, stress management, and problem-solving (11); meanwhile, Hardy et al. (1996) stated that high school athletes prepare for competitions with greater physical and mental energy and have a stronger athletic focus (12). Hanton et al. (2005) indicated that elite-level athletes experience lower anxiety and demonstrate higher mental toughness under pressure (13). Sivri et al. (2023) found that as participants' psychological resilience levels increased, their trait anxiety levels decreased (14). Sheard et al. (2009) emphasized that regular training increases resilience not only physically but also psychologically (15). Konter et al. (2019), in their studies conducted within the context of Turkey, stated that regional values may affect athletes' stress management skills and self-confidence (16).

In conclusion, it was determined that there are significant differences in anxiety levels and mental toughness of professional volleyball players based on certain demographic variables. Overall, the athletes' anxiety and mental toughness levels were found to be at a moderate level. Female athletes exhibited higher anxiety levels compared to males, whereas males showed higher levels of mental toughness compared to females. Based on the obtained findings, it is recommended to implement training and practices aimed at improving anxiety management and enhancing mental toughness, especially at younger ages, in order to boost athletes' psychological performance. Additionally, psychological skill development components should be incorporated into training programs to ensure that athletes become better equipped both mentally and physically.

Authors' Contributions

All authors equally contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study placed a high emphasis on ethical considerations. Informed consent obtained from all participants, ensuring they are fully aware of the nature of the study and their role in it. Confidentiality strictly maintained, with data anonymized to protect individual privacy. The study adhered to the ethical guidelines for research with human subjects as outlined in the Declaration of Helsinki.

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